

## WHAT IS CLAIMED IS:

1        1. A method of time scale modification of a digital  
 2 audio signal comprising the steps of:  
 3        analyzing an input signal in a set of first equally  
 4 spaced, overlapping time windows having a first overlap amount  
 5  $S_a$ ;  
 6        selecting a base overlap  $S_s$  for output synthesis  
 7 corresponding to a desired time scale modification;  
 8        calculating a cross-correlation  $R[k]$  for index value  $k$   
 9 between overlapping frames for a range of overlaps between  
 10  $S_s + k_{\min}$  to  $S_s + k_{\max}$  according to  
 11

$$12 \quad R[k] = \frac{\sum_{i=0}^{L_k-1} \{y[mS_s + i + k] \gg m\} \cdot \{x[mS_a + i] \gg m\}}{M_k}$$

13  
 14 where:  $L_k$  is the overlap length;  $m$  is a constant between 10  
 15 and 15; and  $M_k$  is a measure proportional to overlap length;  
 16        selecting a value  $K$  yielding the greatest cross-  
 17 correlation value  $R[k]$ ;  
 18        synthesizing an output signal in a set of second equally  
 19 spaced, overlapping time windows having a second overlap  
 20 amount equal to  $S_s + K$ .

1        2. The method of claim 1, wherein:  
 2        the measure proportional to the overlap length  $M_k$  is  $L_k/2$ .

1        3. The method of claim 1, wherein:  
 2        the shift amount  $m$  is 12.

1        4. The method of claim 1, wherein:  
 2        said step of calculating the cross-correlation  $R[k]$   
 3        employs only a center half of the overlap region for  $k = 0$ .

1        5. A digital audio apparatus comprising:  
 2        a source of a digital audio signal;  
 3        a digital signal processor connected to said source of a  
 4        digital audio signal programmed to perform time scale  
 5        modification on the digital audio signal by  
 6        analyzing an input signal in a set of first equally  
 7        spaced, overlapping time windows having a first overlap  
 8        amount  $S_a$ ,  
 9        selecting a base overlap  $S_s$  for output synthesis  
 10        corresponding to a desired time scale modification,  
 11        calculating a cross-correlation  $R[k]$  for index value  
 12         $k$  between overlapping frames for a range of overlaps  
 13        between  $S_s + k_{\min}$  to  $S_s + k_{\max}$  according to  
 14

$$15 \quad R[k] = \frac{\sum_{i=0}^{L_k-1} \{y[mS_s + i + k] \gg m\} \cdot \{x[mS_a + i] \gg m\}}{M_k}$$

16  
 17        where:  $L_k$  is the overlap length;  $m$  is a constant between  
 18        10 and 15; and  $M_k$  is a measure proportional to overlap  
 19        length;

20        selecting a value  $K$  yielding the greatest cross-  
 21        correlation value  $R[k]$ ,

22        synthesizing an output signal in a set of second  
 23        equally spaced, overlapping time windows having a second  
 24        overlap amount equal to  $S_s + K$ ; and

25        an output device connected to the digital signal  
26 processor for outputting the time scale modified digital audio  
27 signal.

1        6. The digital audio apparatus of claim 5, wherein:  
2        the measure proportional to the overlap length  $M_k$  is  $L_k/2$ .

1        7. The digital audio apparatus of claim 5, wherein:  
2        the shift amount  $m$  is 12.

1        8. The digital audio apparatus of claim 5, wherein:  
2        said digital signal processor is programmed to calculate  
3 the cross-correlation employing only a center half of the  
4 overlap region for  $k = 0$ .